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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/733,718	12/08/2000	Donald C. Abbott	TI-29679	2496

23494 7590 07/03/2003

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EXAMINER

CAO, PHAT X

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 07/03/2003

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Paper No. 13

Application Number: 09/733,718

Filing Date: 12/08/00

Appellant(s): Abbott et al.

MAILED
JUL 9 1 2003
GROUP 2800

Michael K. Skrehot

For Appellant

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EXAMINER'S ANSWER

This is in response to the appeal brief filed 04/15/03.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

The brief states that there are no related appeals or interferences.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct. The amendment filed under 37 CFR 1.116 on 12/16/02 is entered.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

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The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Claims 1-3, 5, and 8-11 stand or fall together. Claims 12-16 stand or fall together. Claims 21-22 stand or fall together. Claim 4 stands or falls independently of any other claim. Claim 6 stands or falls independently of any other claim. Claim 23 stands or falls independently of any other claim.

(8) Claims Appealed

A substantially correct copy of appealed claims 1-6 and 8-23 appears on pages 9-13 of the Appendix to the appellant's brief. The minor errors are as follows: claims 7 and 24 are not appealed claims because they are indicated as being allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

US 5,767,574	Kim et al.	16 Jun 1998
US 5,521,432	Tsuji et al.	28 May 1996
US 5,360,991	Abys et al.	01 Nov 1994

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 5, 9 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim et al (US. 5,767,574).

Kim, in Figs. 1 and 5, discloses a lead frame for use in the assembly of integrated circuit chips, comprising: a base metal structure 51 of copper having an adherent layer 52 of nickel covering the base metal 51; an adherent film 53 of palladium on the nickel layer 52; and an adherent layer 54 of palladium on the palladium film 53, selectively covering the top surface areas, but not the side surfaces or bottom surface area of the film 53 of lead frame, including areas which are suitable for bonding wiring attachment and solder attachment; wherein the base metal 51 has a thickness of 0.1 to 3.0 mm (column 3, lines 19-21), the nickel layer 52 has a thickness of 0.1 to 2.0 um and the palladium film 53 has a thickness of 0.005 to 0.05 um (column 3, lines 23-25).

Note that the process limitation in claim 1 (selectively), does not carry weight in a claim drawn to structure. In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985).

3. Claims 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Abys et al (US. 5,360,991).

Abys (Fig. 3) discloses a semiconductor device, comprising: a lead frame, comprising: a first layer 23 of palladium covering the lead frame; a second layer 25 of palladium covering the top surface portions, but not the side surface portions or bottom surface portion of the first layer 23, wherein the first layer 23 is thinner than the second layer 25 (column 3, lines 50-53 and column 4, lines 22-23).

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Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4, 6, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US. 5,767,574).

With respect to claim 4, Kim, in column 1, lines 60-67 through column 2, lines 1-3 and related figure 3, further teaches the obviousness of forming the nickel layer being a stack consisting of a nickel layer 32 in the thickness range of 5 u-inches, plated onto the base metal 31, followed by a palladium/nickel layer 33 in the thickness range of 3 u-inches, followed by a nickel layer 34. Such structures would have been obvious because according to Kim, it is known for preventing the copper atoms from diffusing through the nickel layer (column 1, lines 60-62).

With respect to claim 6, Kim further teaches that the palladium layer 54 has a thickness of 0.1 um (column 3, lines 45-46) which is approximately equal to 90 nm as claimed.

With respect to claim 10, it would have been obvious forming the solder attachment comprising materials selected as claimed because these materials are well known in the art for using as the solder attachment (see column 1, lines 33-36).

With respect claim 11, process limitations (reflow temperature compatible with wire bonding temperatures and molding temperatures), do not carry weight in a claim drawn to structure. In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985).

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6. Claims 8 and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US. 5,767,574) in view of Tsuji et al (US. 5,521,432).

With respect to claim 8, the process limitation (providing visual distinction) does not carry weight in a claim drawn to structure. In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985).

With respect to claims 12-16, Tsuji teaches the obviousness of forming a lead frame comprising a chip mount pad for an integrated circuit chip and a plurality of lead segments, each segment having a first end near the mount pad and a second end remote from the mount pad; forming bonding wires 5 interconnecting the chip and the first ends of the lead segments by wire bonding; and encapsulation resin material 6 surrounding the chip, bonding wires and the first ends of the lead segments, while leaving the second ends of the lead segments exposed. Accordingly, it would have been obvious to form the package of Kim with the structures as set forth above because such package structure is well known for protecting the integrated circuit chip from the outside contaminants.

(11) Response to Argument

ISSUE NO. 1: Whether claims 1-3, 5, 9 and 21-23 are patentable under 35 U.S.C. 102(b) over Kim et al (US. 5,767,574).

A) With respect to claim 1, Appellant (page 5 of Brief) argues that Kim does not suggest “an adherent layer of palladium on said palladium film” as claimed because Kim’s Fig. 5 teaches an adherent layer 54 of palladium alloy on a palladium film 53.

It appears Appellant argues that “an adherent layer of palladium” must be a **pure** palladium layer, but not a palladium alloy layer. Appellant’s arguments are not persuasive because the claim language is not

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limited to unalloyed palladium. Therefore, the claim language does not preclude a palladium alloy layer on the palladium film.

Appellant (page 5 of Brief) further argues that Kim does not suggest an adherent layer of palladium 54 “selectively covering areas” of the palladium film 53 as recited in claim 1.

It appears Appellant argues that Kim does not suggest the palladium layer 54 “selectively covering areas” of the palladium film 53 because the adherent palladium layer 54 completely covers film 53, but not portions of film 53. Appellant’s arguments are not persuasive because the adherent palladium layer 54 does not completely cover the palladium film 53 as asserted by Appellant, but rather, the palladium layer 54 selectively covers only the top surface areas of film 53, but not the side surface areas or bottom surface area of film 53. Moreover, it should be noted that claim 1 is not directed to any method for making a leadframe, but rather, is directed to the leadframe structure. Therefore, no matter how the leadframe is actually made, the patentability of the final product must be determined, not the patentability of the process, which in any case have not been presented in “product by process” claims. In this case, the limitation of having an adherent layer of palladium “selectively covering areas” of the palladium film as claimed would not distinguish over Kim’s leadframe structure having the adherent palladium layer 54 which selectively covers only the top surface areas of film 53, but not the side surfaces or bottom surface of film 53.

B) With respect to claim 21, Appellant (page 5 of Brief) argues that Kim does not suggest the noble metal of the first layer 53 is the same as the noble metal of the second layer 54.

Appellant’s arguments are not persuasive because “noble metal” is a group of metals with common chemical properties. Therefore, the limitations of having “a first layer of noble metal” and “a second layer

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of said noble metal” (claim 21) do not necessarily mean that the first layer must have the same noble metal material as the second layer. However, as discussed in section A above, Kim (Fig. 5 and column 3, lines 30-32) does suggest the first noble metal layer 53 and the second noble metal layer 54 both comprising the same noble metal, specifically palladium.

C) With respect to claim 23, Appellant (page 6 of Brief) argues that Kim does not suggest the feature of having “a layer of palladium” overlying “a film of palladium” because Kim teaches a layer of palladium alloy 54 overlying a film of palladium 53.

It appears Appellant argues that “a layer of palladium” must be a pure palladium layer, but not a palladium alloy layer. Appellant’s arguments are not persuasive because the claim language is not limited to unalloyed palladium. Therefore, the claim language does not preclude a palladium alloy layer on the palladium film.

ISSUE NO. 2: Whether claims 21-23 are patentable under 35 U.S.C. 102(b) over Abys et al (US. 5,360,991).

With respect to claims 21 and 23, Appellant (page 6 of Brief) agrees that Abys’s Fig. 3 does disclose a second layer 25 of palladium overlying a first layer 23 of palladium. However, Appellant argues that Abys does not suggest the second palladium layer 25 “covering portions” of the first palladium layer 23 because the second palladium layer 25 completely covers the first palladium layer 23, but not portions of the first palladium layer 23.

Appellant’s arguments are not persuasive because the second palladium layer 25 does not completely cover the first palladium layer 23 as asserted by Appellant, but rather, the second palladium layer 25 only

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covers the top surface portions of the first palladium layer 23, but not the side surfaces or bottom surface of the first palladium layer 23.

ISSUE NO. 3: Whether claims 4, 6, 10 and 11 are patentable under 35 U.S.C. 103(a) over Kim.

Claims 4, 6, 10 and 11 depend from claim 1. As indicated above, Kim does disclose all the subject matter set forth in independent claim 1. The discussions with respect to Kim above in conjunction with **ISSUE NO. 1** are herein incorporated by reference.

- With respect to claim 4, Appellant (pages 6 and 7 of Brief) argues that Kim's Fig. 3 does not suggest a stack of the nickel layers having the thickness in the range as claimed because "Kim (col. 1, line 67 to col. 2, line 3) teaches a Ni strike plated layer about 5 u-inches thick, a Pd/Ni alloy layer about 3 u-inches, and a Ni layer of undisclosed thickness."

It should be noted that "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims In such a situation, the applicant must show the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F. 2d 1575, 16 USPQ 2d 1934 (Fed. Cir. 1990). In this case, Appellant fails to show the criticality of the claimed thickness range because Appellant does not provide any evidence to show that the claimed thickness range will achieve unexpected results, particularly in light of the prior art's thickness range in the stack of nickel layers. Therefore, it would be reasonable to conclude that the claimed thickness range is not critical, and where the general

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conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

- With respect to claim 6, Kim teaches that the palladium layer 54 has a thickness of 0.1 um or 100 nm (column 3, lines 45-46) which is approximately equal to 90 nm as claimed. Therefore, Kim does suggest the invention as claimed because the claimed ranges and prior art ranges do not necessarily overlap but are close enough that one skilled in the art would have expected them to have the same properties. Titanium metals Corporation of America V. Banner, 778 F. 2d 775, 227 USPQ 773 (Fed. Cir. 1985).

- With respect to claim 11, Appellant argues that “reflow temperature” is a physical characteristic of the solder layer and is not a process limitation as asserted by the Examiner. However, Appellant’s arguments are not persuasive because Appellant fails to point out the difference between the “physical characteristic” of the prior art solder layer and the claimed solder layer, particularly in light of the fact that they are both made of the same solder material of tin/lead (see Kim, column 1, lines 33-36).

ISSUE NO. 4: Whether claims 8 and 12-16 are patentable under 35 U.S.C. 103(a) over Kim in view of Tsuji et al (US. 5,521,432).

- Regarding claim 8, Appellant (page 7 of Brief) argues that “providing visual distinction” is a characteristic of the palladium layer and is not a process limitation as asserted by the Examiner.

Appellant’s arguments are not persuasive because one skilled in the art would not consider that “providing visual distinction” is a characteristic of the palladium. Therefore, because claim 8 is directed to the product, no matter how it is actually made, the patentability of the final product must be determined, not the patentability of the process, which in any case have not been presented in “product by process” format.

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In this case, Appellant fails to point out which structure limitation recited in claim 8 is not suggested by Kim.

- Regarding claim 12, Appellant (pages 7-8) again argues that Kim does not suggest “an adherent layer of palladium on a palladium film.”

Appellant’s arguments are not persuasive because Kim’s Fig. 5 does teach an adherent layer 54 of palladium on a palladium film 53. The discussions with respect to Kim above in conjunction with **ISSUE NO. 1** are herein incorporated by reference.

Appellant further argues that Tsuji does not suggest selective deposition of palladium in bonding wire attachment areas of lead segments.

This argument has no immediate apparent relevance to the issues presented by the rejection since Appellant cannot show nonobviousness by attacking references individually where the rejection is based upon a combination of references. *In re Young*, 403 F. 2d 754, 757, 159 USPQ 725, 728 (CCPA 1968). It should be noted that the rejection is not based on anticipation, but rather, is based on obviousness. The Examiner relies on the combined teachings of Kim and Tsuji. Tsuji is not relied on for teaching the deposition of palladium in bonding wire attachment areas of lead segments. Kim discloses the deposition of palladium in bonding wire attachment areas of lead segments (Figs. 1 and 5). Tsuji is relied on for showing that it was known to form the package structure as claimed for protecting the integrated circuit chip from outside contaminants. The Examiner thus regards Appellant’s assertions as constituting evidence that Appellant has failed to consider as a whole the prior art teachings disclosed by the combination of the references. Claims 13-16 depend from claim 12 and are therefore not patentable for the reasons presented above for that claim.


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For the above reasons, it is believed that the rejections should be sustained.


Respectfully submitted,


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December 6, 2001


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